

An Introduction of
Global Flood Alert System (GFAS)

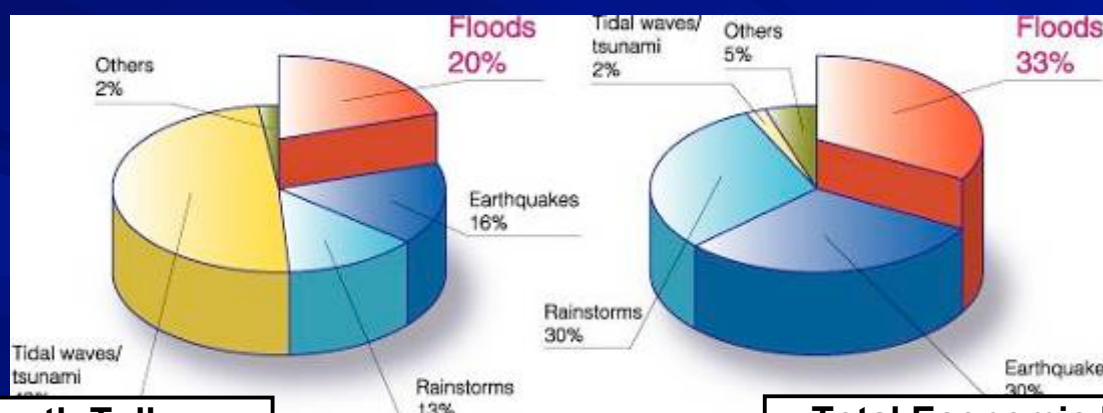
November 6, 2006
at 6th GPM Planning Workshop

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Secretary General, IFNet
Director of 2nd Research Department,
Infrastructure Development Institute-JAPAN

I Backgrounds

Target: Reduction of Human Loss

World's natural disaster (1995-2004)



Total Death Toll:
(about 470,000 people)

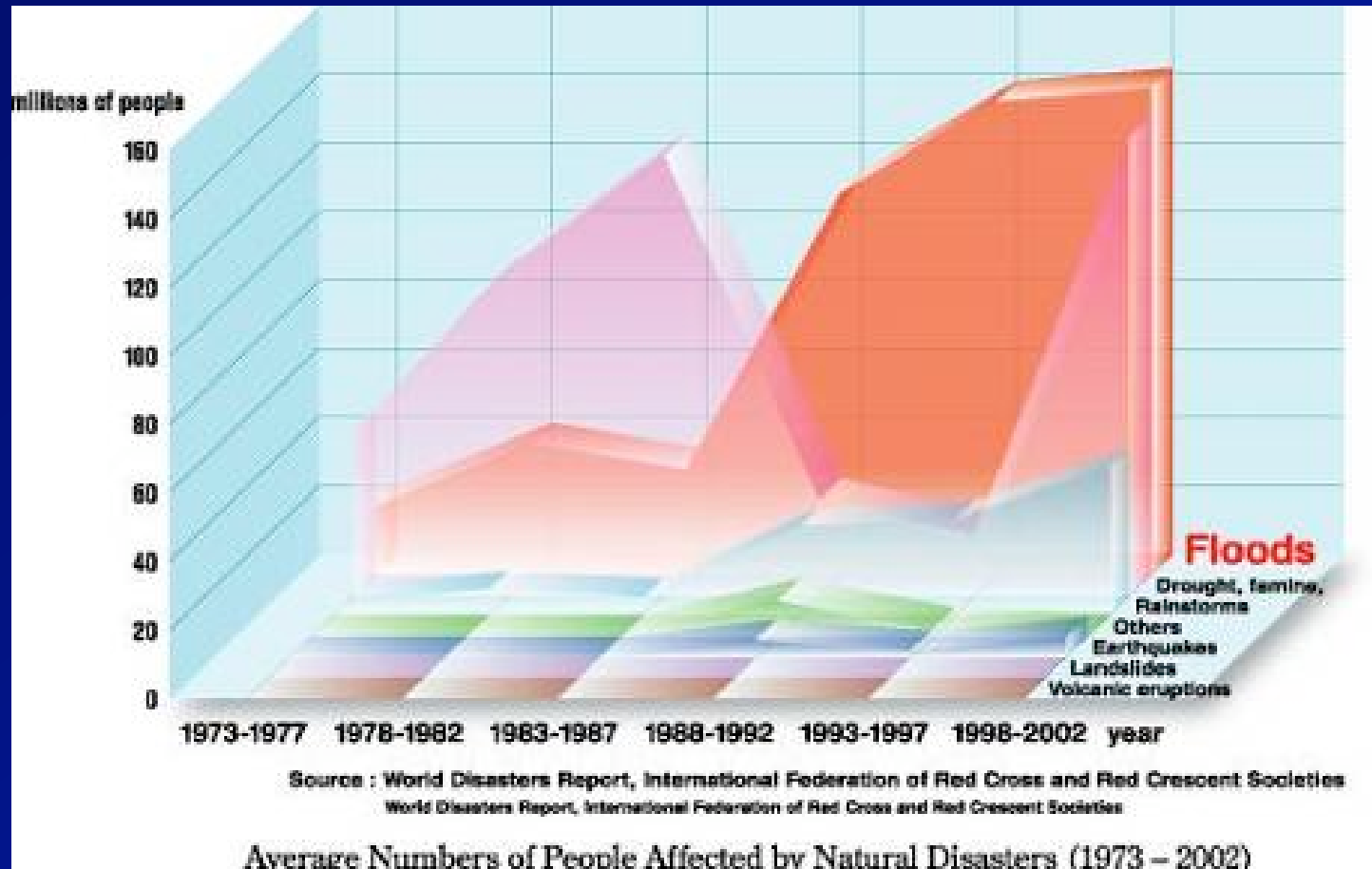
Source: EM-DAT, CRED

Total Economic Loss:
(about 49 billion. US\$)

- ◆ Tidal waves/Tsunami 49%
- ◆ Floods 20%
- ◆ Earthquakes 16%

Statistics of Flood Disasters

Average Numbers of People Affected
by Natural Disasters (1973-2002)



Source: "World Disaster Report 2004", International Federation of Red Cross and Red Crescent Societies

Measures to Reduce Human Loss

◆ Structural Measures:

Levee, Flood Control Dam, Flood Way, Retarding Basin, etc.

◆ Non-structural Measures:

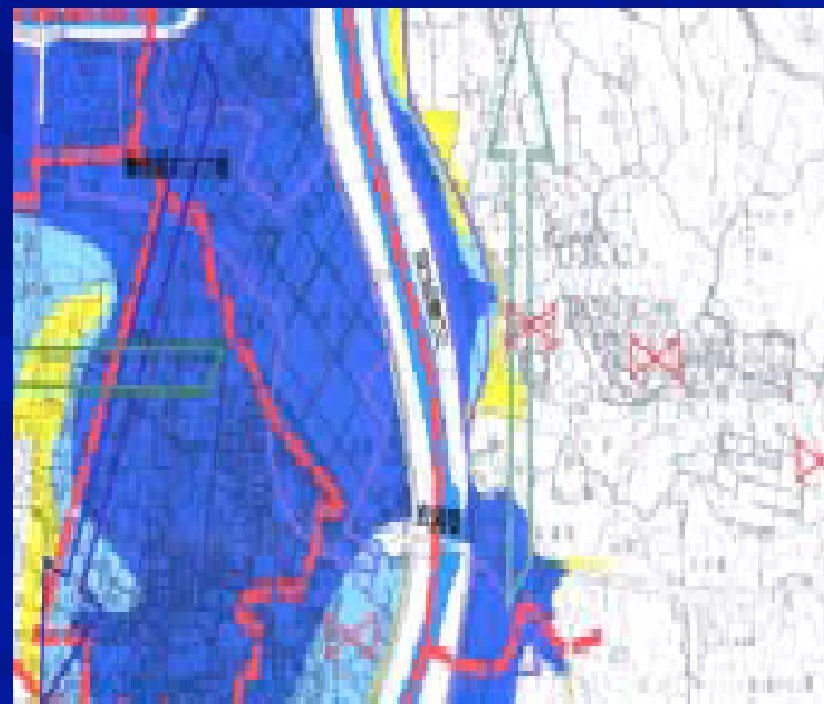
1. In Emergency (Early Warning System)

- Flood Forecasting
- Flood Warning
- Evacuation Advice/Order

2. In Normal Time

- Flood Hazard Map
- Flood Fighting Drill,

Flood Hazard Map



Challenges for Flood Forecasting



2002 flood of Vltava (Moldau) river
Left bank in the vicinity of the
Japanese Embassy)
During flood on August 14 (right
photo), and peacetime on
September 4 (left photo)

Photo: Tomio Tatsuki, first secretary of Japanese Embassy in Czech

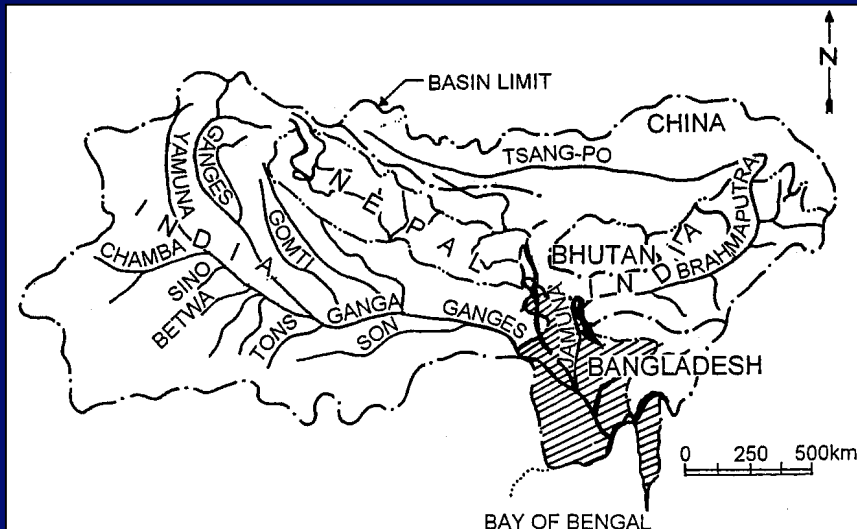
To reduce human loss in relatively the short term, establishment of EWS with flood forecasting is a effective way. However a lot of river basins are confronted with challenges setting up FFS .

- ◆ **O&M cost etc. for telemetry** (compensated with satellite data)
- ◆ **Data Transmission in Trans-boundary Rivers** (compensated with satellite data)
- ◆ **Accurate Forecasting for Flash Flood in small/middle rivers**



Other means of data transmission than telemetry:
Community Participation, Cell-phone, **Satellite Rainfall**, etc.

Floods in Bangladesh



Ganges-Bramaputra-Meghna (GBM) River Basin Source: JICA

Situation of Bangladesh

- ◆ Located downstream delta
- ◆ 10% of GBM river basin
- ◆ Upstream (India, Nepal, Bhutan, China)
- ◆ No hydrological information of upstream countries except ones close to border

2004 Flood

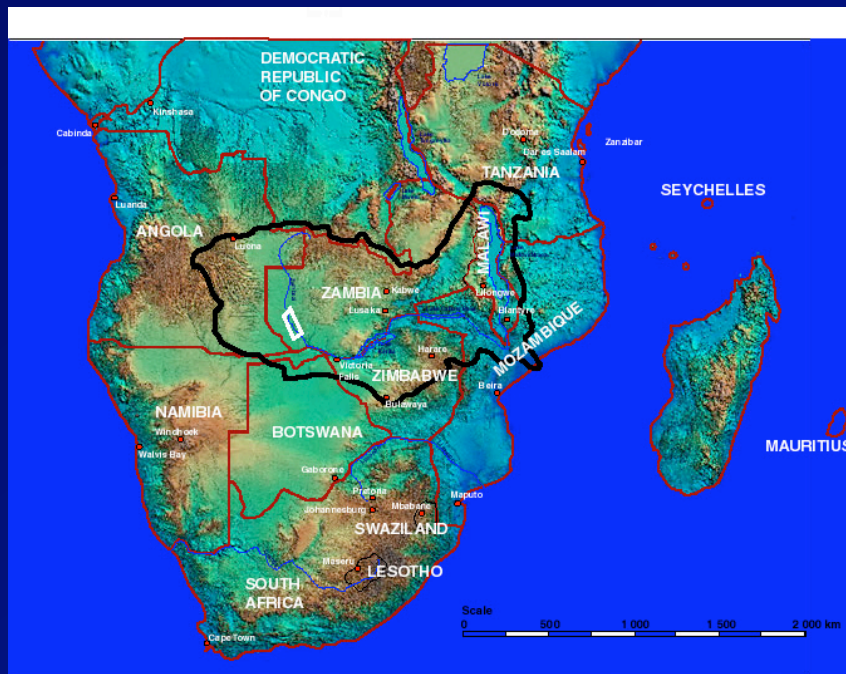
Two young girls push a pot full of relief food as they swim back to their submerged homes at the downtown of Dhaka July 25 while flood victims queue up before a homoeopathic dispensary at the neighbouring locality as the government is yet to offer healthcare service.

Courtesy — New Age



Photo: Mr. Shahidul Islam Chowdhury, BANGLADESH

Floods in Mozambique



The Zambezi River and Situation of Mozambique

- ◆ Fourth largest river basin in Africa
- ◆ Located downstream most
- ◆ Upstream (Malawi, Tanzania, Zambia, Dem. Rep. of Congo, Botswana, Namibia)



2002 Flood in the Zambezi River

Photo, Map: Dr. Imasiku A. Nyambe, University of Zambia

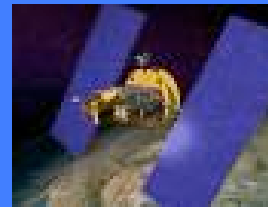
II GFAS

Schematic Figure of GFAS

i) Space Agencies

NASA Homepage

```
Obtain data list:  
Data list obtained:  
(1)3842RT.2005012621.bin.gz  
(2)3842RT.2005012703.bin.gz  
(3)3842RT.2005012705.bin.gz  
(4)3842RT.2005012708.bin.gz  
(5)3842RT.2005012709.bin.gz  
(6)3842RT.2005012712.bin.gz  
(7)3842RT.2005012715.bin.gz  
(8)3842RT.2005012718.bin.gz  
Latest data download:  
xxx Latest data checked:  
(2005/01/28 14:10:37)
```



Observation Satellites

Heavy rainfall around
In the XX river basin



River

ii) IDI-Japan

Data Download

Data Processing

Mapping, Email

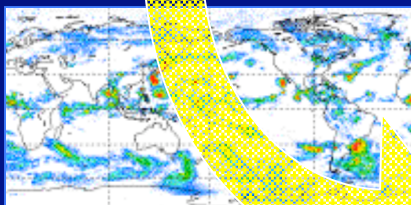


System Development

iv) Hydrological Service

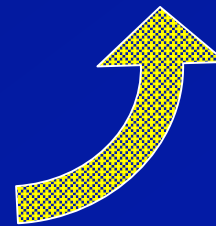
River Authorities

Flood Forecasting and Warning
using GFAS Information etc.



iii) IFNet

1. IFNet Homepage
2. Email of Heavy Rain
to IFNet members in charge of Flood
Forecasting and Warning



System Concept of GFAS

1. Collaboration with

- i) **Space Agencies** as rainfall data provider
- ii) **IDI** as rainfall analyzer, system developer,
alerting information provider
- iii) **IFNet** as transmission network
- iv) **Hydrological Services , River Authorities**
in charge of flood forecasting and warning

2. Objectives

- Practical Use for FEW system
- Raising awareness of the importance of FEW

Expectations for Satellite Rainfall

Satellite rainfall is expected to perform in:

- ◆ making up for the absence of real time data,
- ◆ diversifying hydrological data source,
- ◆ providing ocean area data,
- ◆ improving accuracy of existing flood forecasting system by its three dimensional observation,
- ◆ others.

especially in river basins with:

- ◆ large river basins which is far larger than 3B42RT's mesh, and which have much longer run-off than 3B42RT's data delivery time lag,
- ◆ without any telemetry systems
- ◆ trans-boundary rivers where prompt data transmission across boundaries is difficult.

III 1st Phase Launch of GFAS

- ◆ Purpose: **Verification** of satellite rainfall in flood forecasting
- ◆ Data source: NASA “3B42RT”
- ◆ GFAS information
 - 1) Publicized information on IFNet website
 - **Global and regional rainfall map with heavy rain area**
 - **Text data**
 - 2) Customized information on request
 - **Rainfall map for single country/river basin**
 - **E-mail delivery of heavy rain notice**



E-mail SAMPLE:

Heavy rain information to ZZ basin.

Mean basin precipitation* of YY mm/day, which exceeds 5 year return period rain, was observed.

Please check it on IFNet website !

[**http://xxxxxxxxxxxxxxxxxxxxxxxxxxxx**](http://xxxxxxxxxxxxxxxxxxxxxxxxxxxx)

IFNet Homepage



International Flood Network



[LINK](#) [FLOOD INFORMATION](#)

Click here!

IFNet PROJECTS

GLOBAL FLOOD ALERT SYSTEM



WORST FLOODS
- 2005
- 2006

NEWS LETTERS
[>>>](#)

IFNet PROJECTS

IFNet ACTION REPORT 2006
Reports of good practices and lessons learned relating to flood disasters reductions [>>>](#)

FLOOD HAZARD MAP MANUAL
This manual describes in brief the background, purpose, production and distribution of Flood Hazard Maps, as well as their verified effectiveness and current usage in Japan.
[pdf](#)

WORLD RIVERS AND THEIR BASINS
Download the map of world's river basins.
[pdf](#)

IFNet BROCHURE
- [English](#)
- [Japanese](#)

ICWEM 2007 will be held in Dhaka, Bangladesh during 12-14 March 2007.
04/07/2006

FLASH NEWS: Flood and Landslide in Southern Sulawesi Island, Indonesia
23/06/2006

WORST FLOODS: Floods and landslides in the first rainy season in Colombia
22/06/2006

Global Flood Alert System (GFAS) has been launched on a trial basis
15/06/2006

WORST FLOODS: Flood in Thailand resulted 73 death tolls
05/06/2006

Report: 4th Annual Mekong Flood Forum in Siem Reap, Cambodia
31/05/2006

IFNet held 2 sessions at the 4th World Water Forum in Mexico
10/04/2006

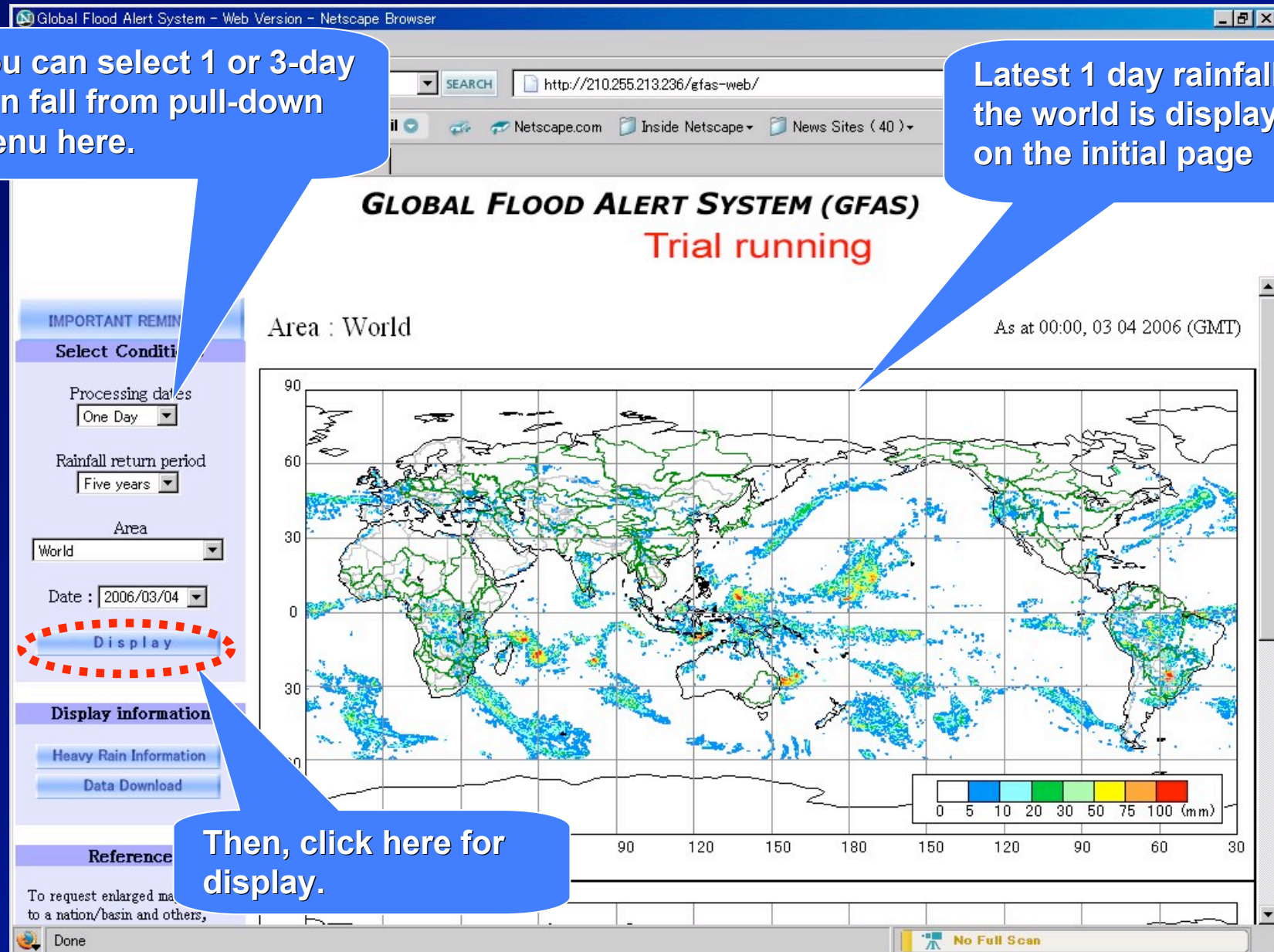
CALL FOR FLOOD INFORMATION
There are many flood disasters that remain unknown to the other part of the world. If you have any information on floods, please report us your burden caused by floods and apprise messages to the world. Your information will be posted on this website. (see the [FLOOD INFORMATION](#)). You can use this form and send via email: [doc](#)
email: info@internationalfloodnetwork.org

| [CONTACT US](#) | Copyright (c) 2006 International Flood Network. All rights reserved. |

GFAS starts with daily rainfall

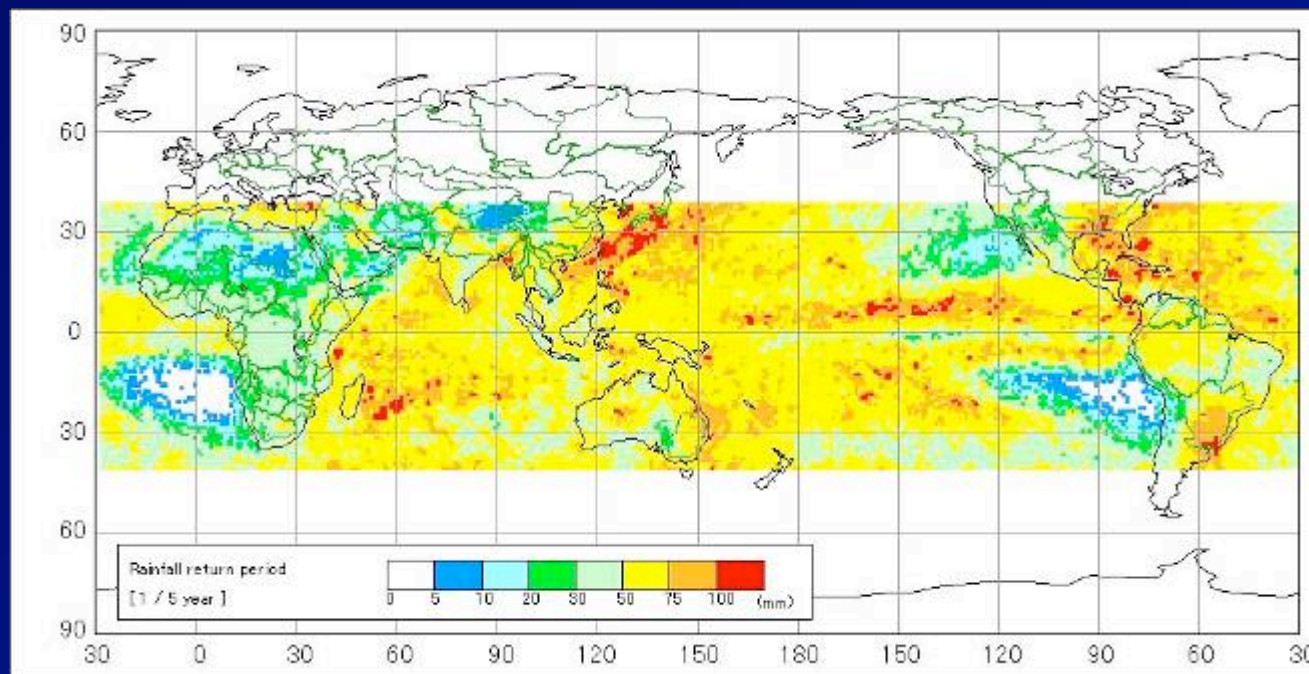
You can select 1 or 3-day rain fall from pull-down menu here.

Latest 1 day rainfall in the world is displayed on the initial page



Then, click here for display.

Probability Rainfall



Note:

This is a sample map showing 5 year return period rainfall of 40-40 N-S, but the real map will show in the band of **60-60 N-S**.

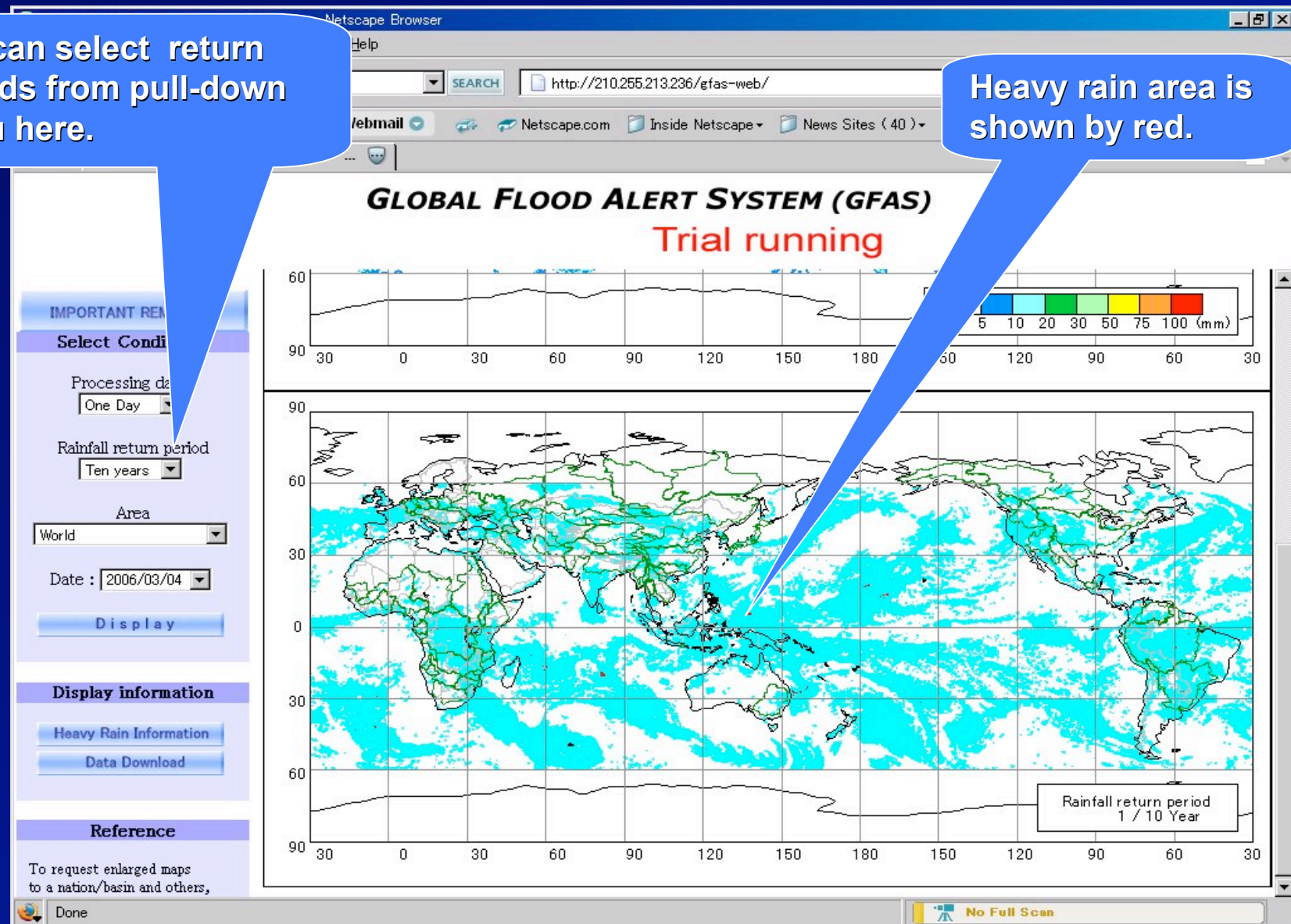
Daily precipitation 5 year return period

Data for calculation: TRMM 3B42(1998-2001) , 3B42RT(2002 –2004)

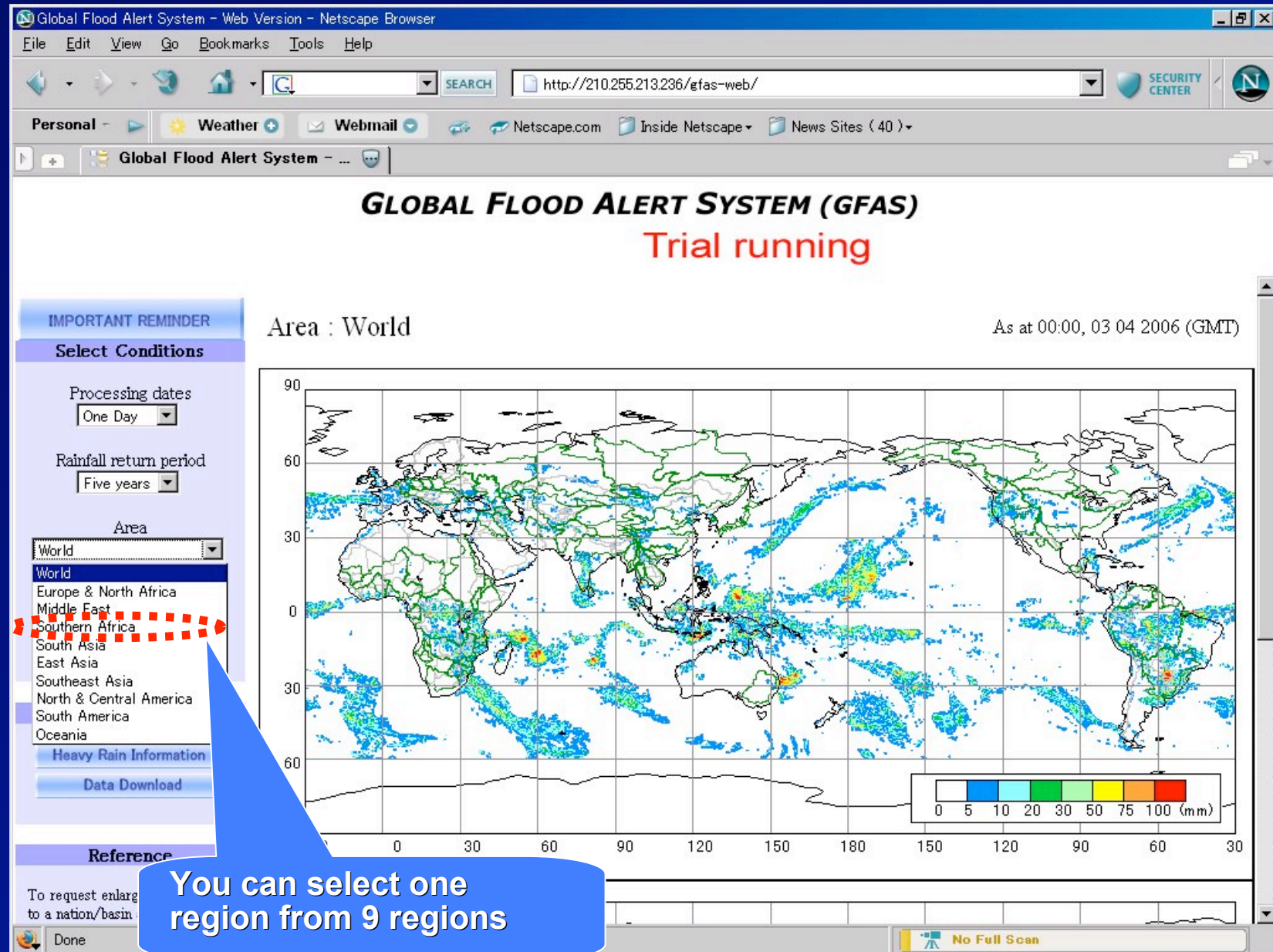
Heavy rain area exceeding 5 or 10-year return period

You can select return periods from pull-down menu here.

Heavy rain area is shown by red.

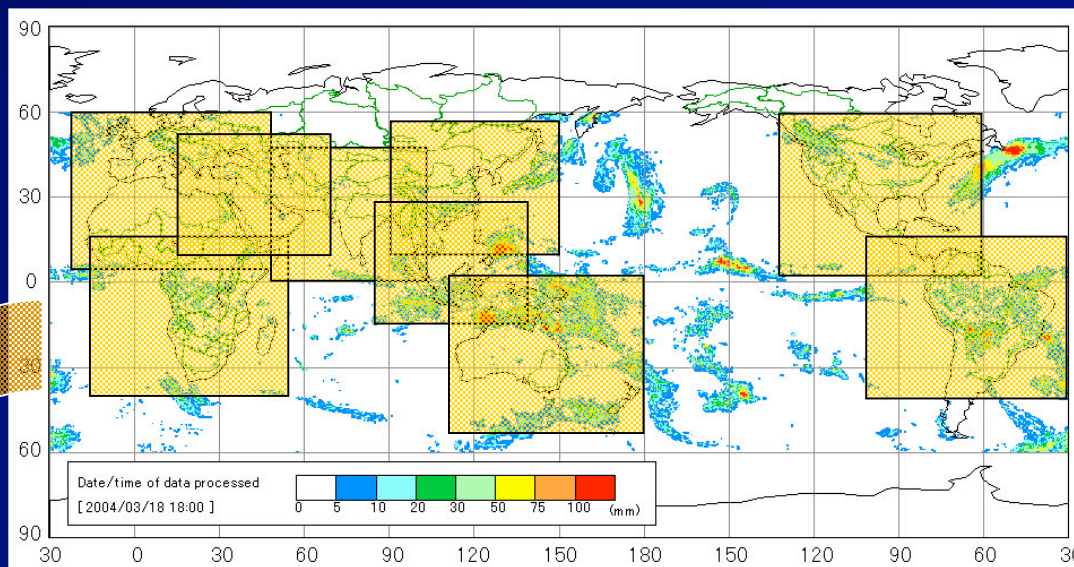


Enlarged maps for 9 Regions

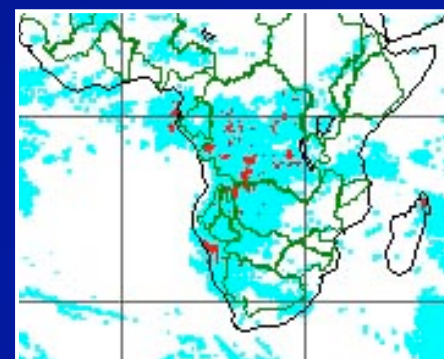
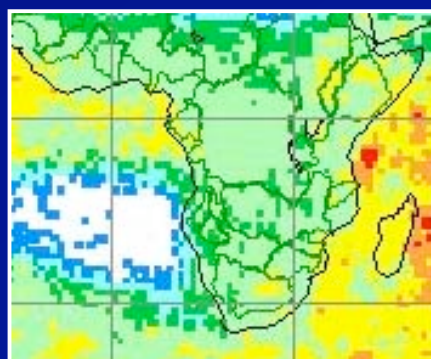
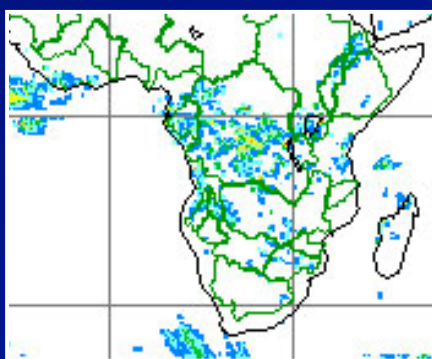


You can select one region from 9 regions

Enlarged maps for 9 Regions

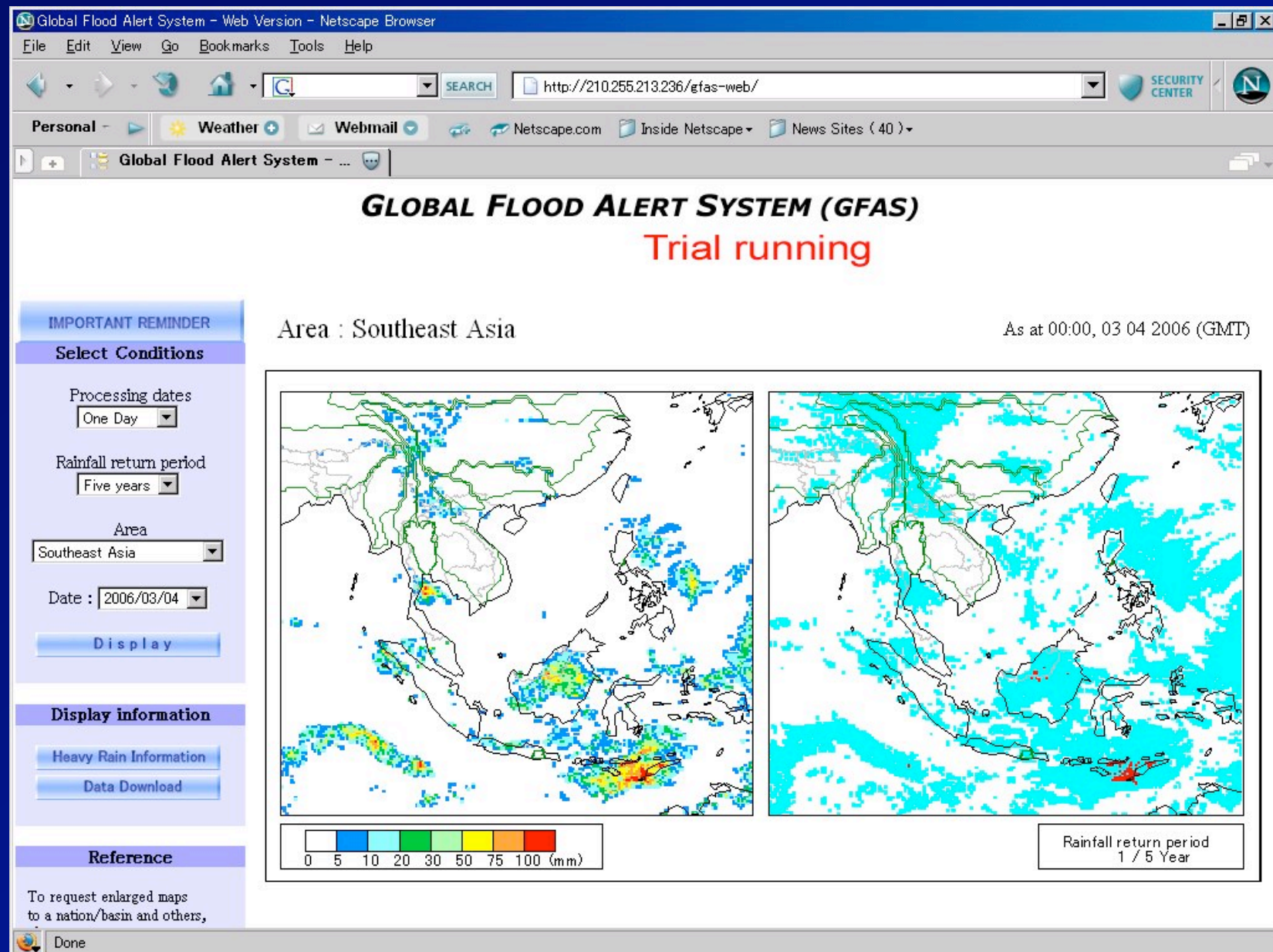


Europe & North Africa
Middle East
South Africa
South Asia
Southeast Asia
East Asia
North America
South America
Oceania

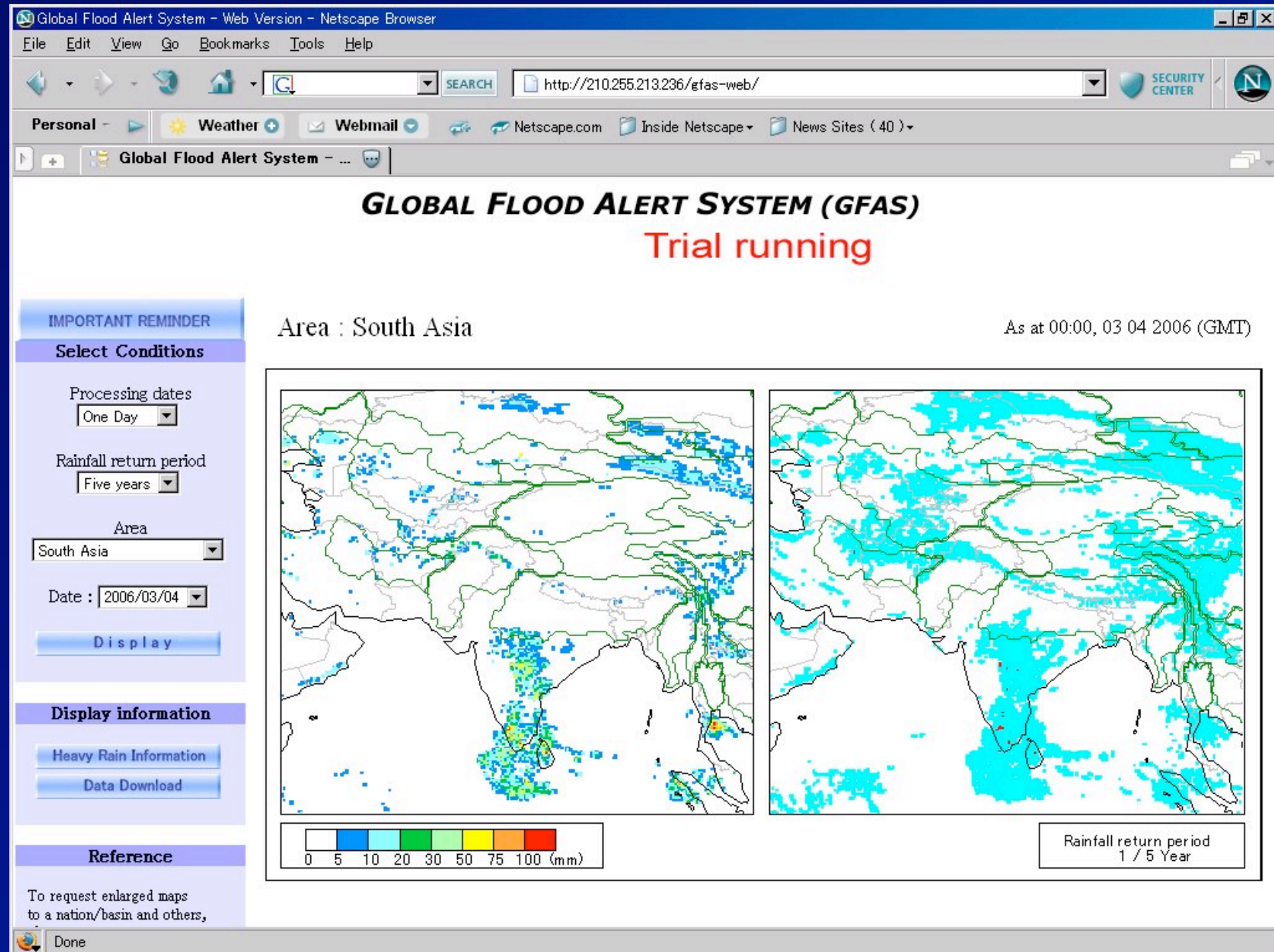


Regional Map Sample (South Africa)

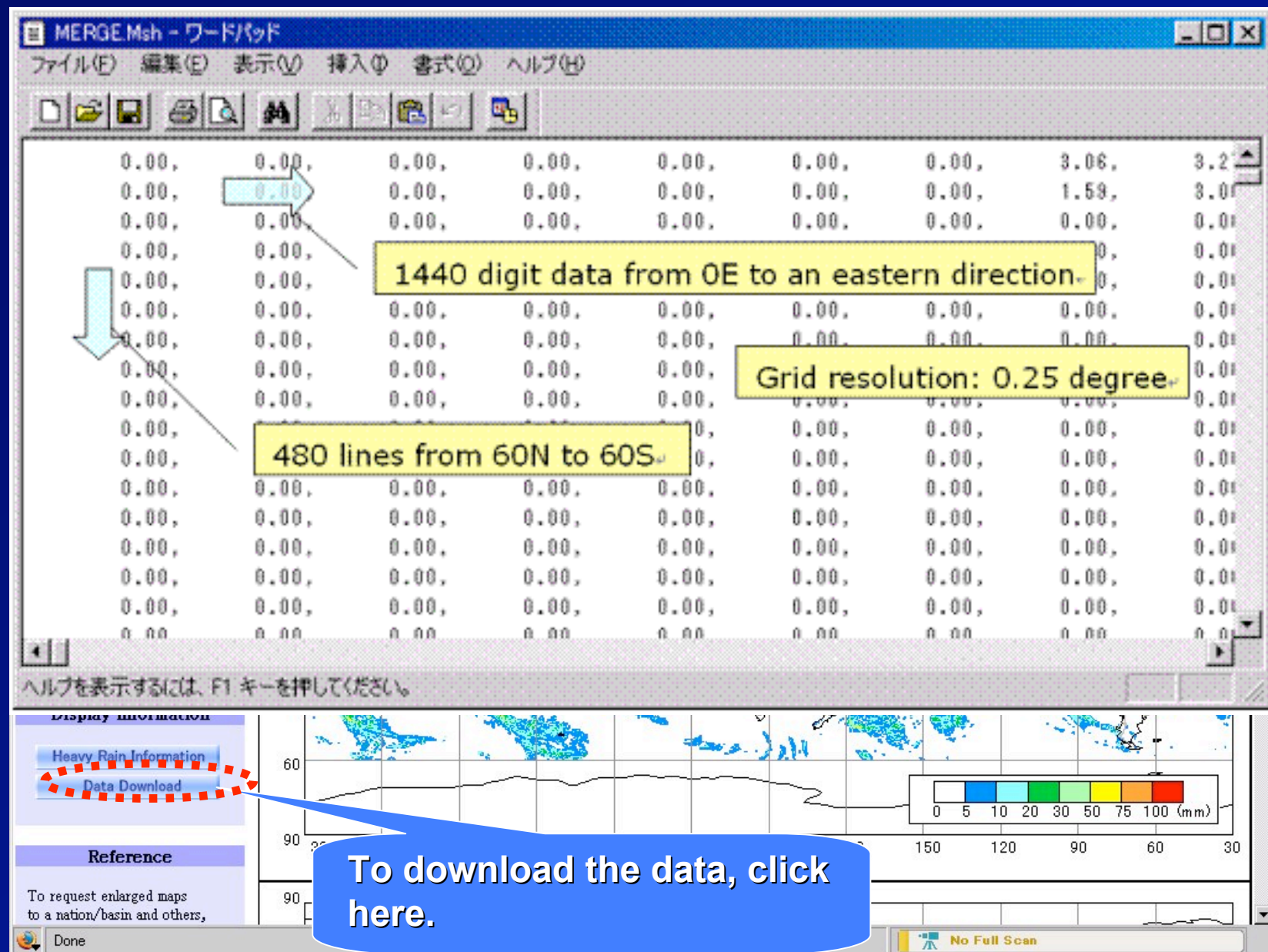
Area: Southeast Asia



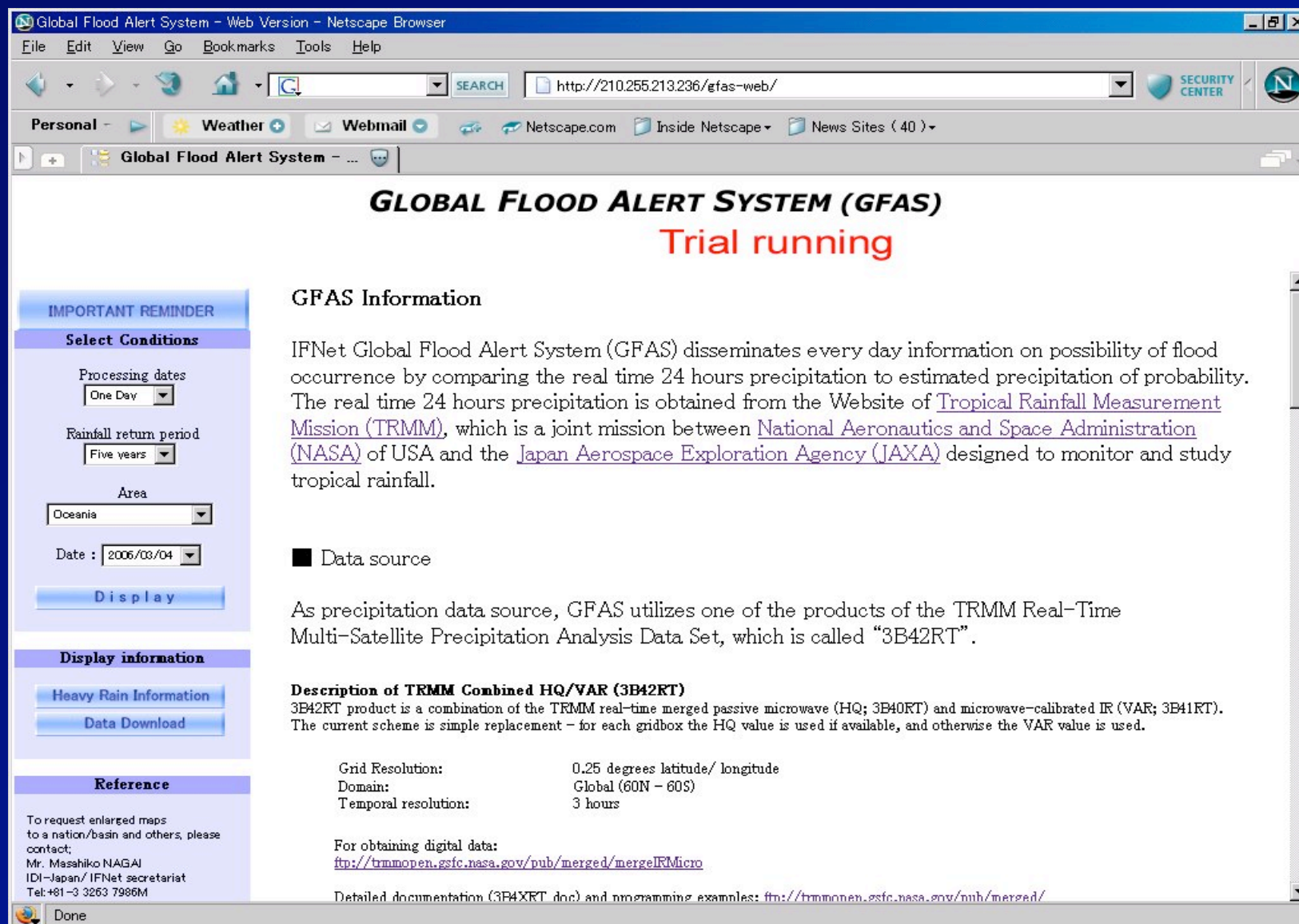
Area: South Asia



Text daily rainfall data available (Excel or Word Pad)



About GFAS (through consultation with NASA)



GLOBAL FLOOD ALERT SYSTEM (GFAS)
Trial running

GFAS Information

IFNet Global Flood Alert System (GFAS) disseminates every day information on possibility of flood occurrence by comparing the real time 24 hours precipitation to estimated precipitation of probability. The real time 24 hours precipitation is obtained from the Website of [Tropical Rainfall Measurement Mission \(TRMM\)](#), which is a joint mission between [National Aeronautics and Space Administration \(NASA\)](#) of USA and the [Japan Aerospace Exploration Agency \(JAXA\)](#) designed to monitor and study tropical rainfall.

■ Data source

As precipitation data source, GFAS utilizes one of the products of the TRMM Real-Time Multi-Satellite Precipitation Analysis Data Set, which is called "3B42RT".

Description of TRMM Combined HQ/VAR (3B42RT)

3B42RT product is a combination of the TRMM real-time merged passive microwave (HQ; 3B40RT) and microwave-calibrated IR (VAR; 3B41RT). The current scheme is simple replacement - for each gridbox the HQ value is used if available, and otherwise the VAR value is used.

Grid Resolution:	0.25 degrees latitude/ longitude
Domain:	Global (60N - 60S)
Temporal resolution:	3 hours

For obtaining digital data:
<http://trmmopen.gsfc.nasa.gov/pub/merged/mergedRMicro>

Detailed documentation (3B42RT doc) and programming examples: <ftp://trmmopen.gsfc.nasa.gov/pub/merged/>

Reference

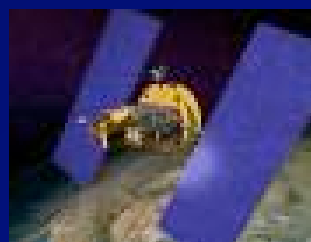
To request enlarged maps to a nation/basin and others, please contact;
Mr. Masahiko NAGAI
IDI-Japan/ IFNet secretariat
Tel: +81 -3 3263 7986M

Future Activities/Vision

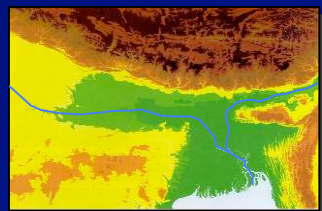
1. Optimization

- Verification for foreign rivers
 - Verification of
 - Satellite Rainfall by comparing with ground rain-gauge
 - Rainfall Return Period of 1/5, 1/10 by adding more data
- Response to user's need
 - More enlarged maps for a single river basin
 - Other rainfall period than daily
(half day, 2 days, 3 days etc.)
 - Other return period than 1/5, 1/10
(2 years, 30 years etc.)
 - Other criteria for sending e-mail
(number and place of grid exceeding certain probability, etc.)

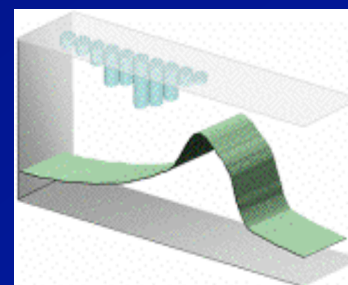
2. Use of Satellite Rainfall in Flood Forecasting



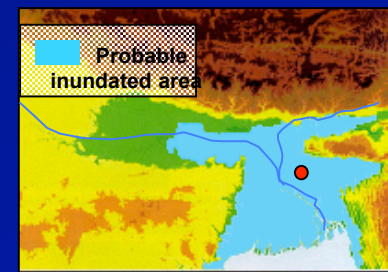
Satellite Rainfall



Global Digital Map



Run-off Analysis



Inundation Area

Thank You

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www.internationalfloodnetwork.org*